

CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1 1. A distributed data monitoring and control system suitable for residential
2 automation applications, comprising:

3 at least one sensor suitably integrated with a residential system configured to
4 provide a sensor data signal;

5 at least one wireless communication device communicatively coupled with the at
6 least one sensor configured to receive the sensor data signal and format a first encoded
7 data signal comprising a communication device identifier and a predetermined function
8 code responsive to the received sensor data signal wherein the wireless communication
9 device broadcasts the first encoded data signal over a wireless transmission media to a
10 gateway communicatively coupled to a wide area network configured to receive and
11 translate the first encoded data signal into a wide area network data transfer protocol for
12 transmission to a computing device configured to collect, process, and store, the received
13 sensor data signal.

1 2. The system of claim 1, wherein the at least one wireless communication
2 device is configured to broadcast the first encoded data signal via a transmission medium
3 selected from the group consisting of radio-frequency (RF), infra-red (IR), and
4 ultrasound.

1 3. The system of claim 1, wherein the at least one wireless communication
2 device broadcasts the first encoded data signal to a computing device configured to
3 execute a computer program having a first segment for evaluating the first encoded data
4 signal to identify the at least one wireless communication device.

1 4. The system of claim 1, wherein the at least one wireless communication
2 device broadcasts the first encoded data signal to a computing device configured to
3 execute a computer program having a second segment for evaluating the first encoded
4 data signal to identify a parameter value associated with the sensor.

1 5. The system of claim 1, wherein the at least one wireless communication
2 device is configured to receive a second encoded data signal via a transmission medium
3 selected from the group consisting of radio-frequency (RF), infra-red (IR), and
4 ultrasound.

1 6. The system of claim 1, wherein the gateway is configured to insert timing
2 information into the first encoded data signal.

1 7. The system of claim 1, wherein the gateway is configured to translate the
2 first encoded data signal into TCP/IP for communication over the wide area network.

1 8. The system of claim 1, wherein the wide area network is the Internet.

1 9. The system of claim 1, wherein the wide area network is an Intranet.

1 10. The system of claim 4, wherein the computer program uses a look-up table
2 that associates at least one parameter value associated with the sensor to a data input.

1 11. The system of claim 4, wherein the at least one wireless communication
2 device broadcasts the first encoded data signal to a computing device configured to
3 execute a computer program having a third segment for evaluating the relative health of
4 the at least one wireless communication device.

1 12. The system of claim 5, wherein the second encoded data signal originates
2 from a closely located second wireless communication device associated with at least one
3 sensor and identifies a parameter value associated with the associated sensor.

1 13. The system of claim 5, wherein the at least one wireless communication
2 device is configured to generate and broadcast a composite encoded data signal
3 comprising information from the first and second encoded data signals.

1 14. The system of claim 11, wherein the computer program evaluates the
2 relative health of the at least one wireless communication device based on an algorithm
3 that monitors elapsed time between received first encoded data signals.

1 15. The system of claim 13, wherein the at least one wireless communication
2 device is in communication with an actuator and is configured to receive an encoded
3 command signal generated by a computing device configured to execute a computer
4 program responsive to the received sensor data signal.

1 16. The system of claim 15, wherein encoded command signals are routed in
2 response to the previously identified wireless communication device(s) responsible for
3 generating and forwarding an associated received sensor data signal.

1 17. The system of claim 15, wherein the actuator is responsive to a received
2 command signal.

1 18. The system of claim 15, wherein encoded command signals are routed
2 periodically to the at least one wireless communication device to initiate a sensor data
3 signal.

1 19. The system of claim 15, wherein encoded command signals are routed
2 periodically to the at least one wireless communication device to initiate a wireless
3 communication device health check response signal.

1 20. The system of claim 15, wherein encoded command signals contain
2 encoded audio broadcast messages.

1 21. A method for monitoring residential systems, comprising:
2 providing at least one gateway device in communication with a wide area network
3 wherein the gateway device is configured to receive an encoded broadcast signal having a
4 first portion that identifies an originating wireless communication device and a second
5 portion that contains a function code responsive to a sensed parameter;
6 using the gateway device to translate and embed the received broadcast signal
7 within a data packet with a network data transfer protocol;
8 using the gateway device to transmit the data packet over the wide area network to
9 a designated computing device;
10 receiving the data packet at the designated computing device; and
11 using the designated computing device to identify the originating wireless
12 communication device and the associated function code contained within the data packet.

1 22. The method of claim 21, wherein the step of providing the at least one
2 gateway device is accomplished by communicatively associating the gateway with the
3 Internet.

1 23. The method of claim 21, wherein the step of providing the at least one
2 gateway device is accomplished by communicatively associating the gateway with a
3 dedicated Intranet.

1 24. The method of claim 21, wherein the step of using the gateway device to
2 translate and embed the received broadcast signal in a data packet is accomplished with
3 terminal control protocol / Internet protocol (TCP/IP).

1 25. The method of claim 21, wherein the step of providing the at least one
2 gateway device is accomplished with a gateway device in communication with at least
3 one wireless communication device configured to broadcast an encoded broadcast signal
4 via a transmission medium selected from the group consisting of radio-frequency (RF),
5 infra-red (IR), and ultrasound.

1 26. The method of claim 21, further comprising:
2 using the designated computing device to associate timing information responsive
3 to the received broadcast signal;
4 storing parameter information derived from the function code; and
5 providing access to the stored parameter information upon client request.

1 27. The method of claim 21, wherein the step of providing access to the stored
2 parameter information is accomplished using a web browser.

1 28. The method of claim 27, wherein the step of providing access to the stored
2 parameter information is accomplished using hypertext mark-up language (HTML).

1 29. The method of claim 27, wherein the step of providing access to the stored
2 parameter information is accomplished using at least one graphical user interface.

1 30. A method for monitoring and controlling residential systems, comprising:
2 providing at least one gateway device in communication with a wide area network
3 wherein the gateway device is configured to receive a first encoded signal having a first
4 portion that identifies an originating wireless communication device and a second portion
5 that contains a function code responsive to a sensed parameter and wherein the gateway
6 device is configured to broadcast a second encoded signal that identifies at least one
7 wireless communication device to traverse ending at a destination wireless
8 communication device and wherein the second encoded signal contains a command;
9 using the gateway device to translate and embed the received broadcast signal
10 within a data packet with a network data transfer protocol;
11 using the gateway device to transmit the data packet over the wide area network to
12 a designated computing device;
13 receiving the data packet at the designated computing device;
14 using the designated computing device to identify the originating wireless
15 communication device and the associated function code contained within the data packet;
16 deriving parameter information from the function code;
17 generating at least one command in response to the derived parameter
18 information;
19 embedding the command information and appropriate wireless communication
20 device routing information in a data packet;
21 transmitting the data packet to the appropriate gateway; and
22 using the gateway to construct an appropriate second encoded signal responsive to
23 the data packet.

1 31. The method of claim 30, wherein the step of providing the at least one
2 gateway device is accomplished by communicatively associating the gateway with the
3 Internet.

1 32. The method of claim 31, wherein the step of providing the at least one
2 gateway device is accomplished by communicatively associating the gateway with a
3 dedicated Intranet.

1 33. The method of claim 31, wherein the step of using the gateway device to
2 translate and embed the received broadcast signal in a data packet is accomplished with
3 terminal control protocol / Internet protocol (TCP/IP).

1 34. The method of claim 31, wherein the step of providing the at least one
2 gateway device is accomplished with a gateway device in communication with at least
3 one wireless communication device configured to broadcast an encoded signal via a
4 transmission medium selected from the group consisting of radio-frequency (RF), infra-
5 red (IR), and ultrasound.

1 35. The method of claim 31, further comprising:
2 using the designated computing device to associate timing information responsive
3 to both the first and second encoded signals;
4 deriving parameter information from the function code;
5 using the parameter information in a control algorithm to derive system outputs;
6 providing the system outputs upon client request.

1 36. The method of claim 31, wherein the step of providing system outputs is
2 accomplished using a web browser.

1 37. The method of claim 36, wherein the web browser uses hypertext mark-up
2 language (HTML).

1 38. The method of claim 36, wherein the web browser uses at least one
2 graphical user interface.